



# Improving the GPS L1 Signal

**GPS III Offers the Opportunity**

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**IGS Symposium, Bern**

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U.S. Department of the Interior  
U.S. Geological Survey

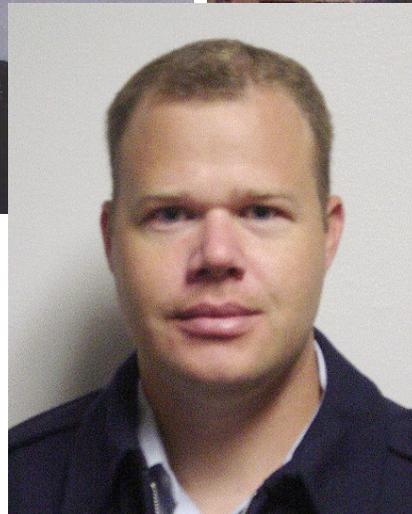
# Introducing L1C Project Leadership



**Dr. Ken Hudnut  
Co-Chair, USGS**



**1Lt. Bryan  
Titus  
Co-Chair,  
JPO**



**2Lt. Jason Taylor**



**Tom  
Stansell**



## **An Invitation: Contact Information**

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**E-mail: L1C\_GPS@USGS.gov**

**FAX: 626-583-7827**

**Mail: L1C GPS**

**Attn: Ken Hudnut**

**525 South Wilson Ave.**

**Pasadena, CA 91106-3212**



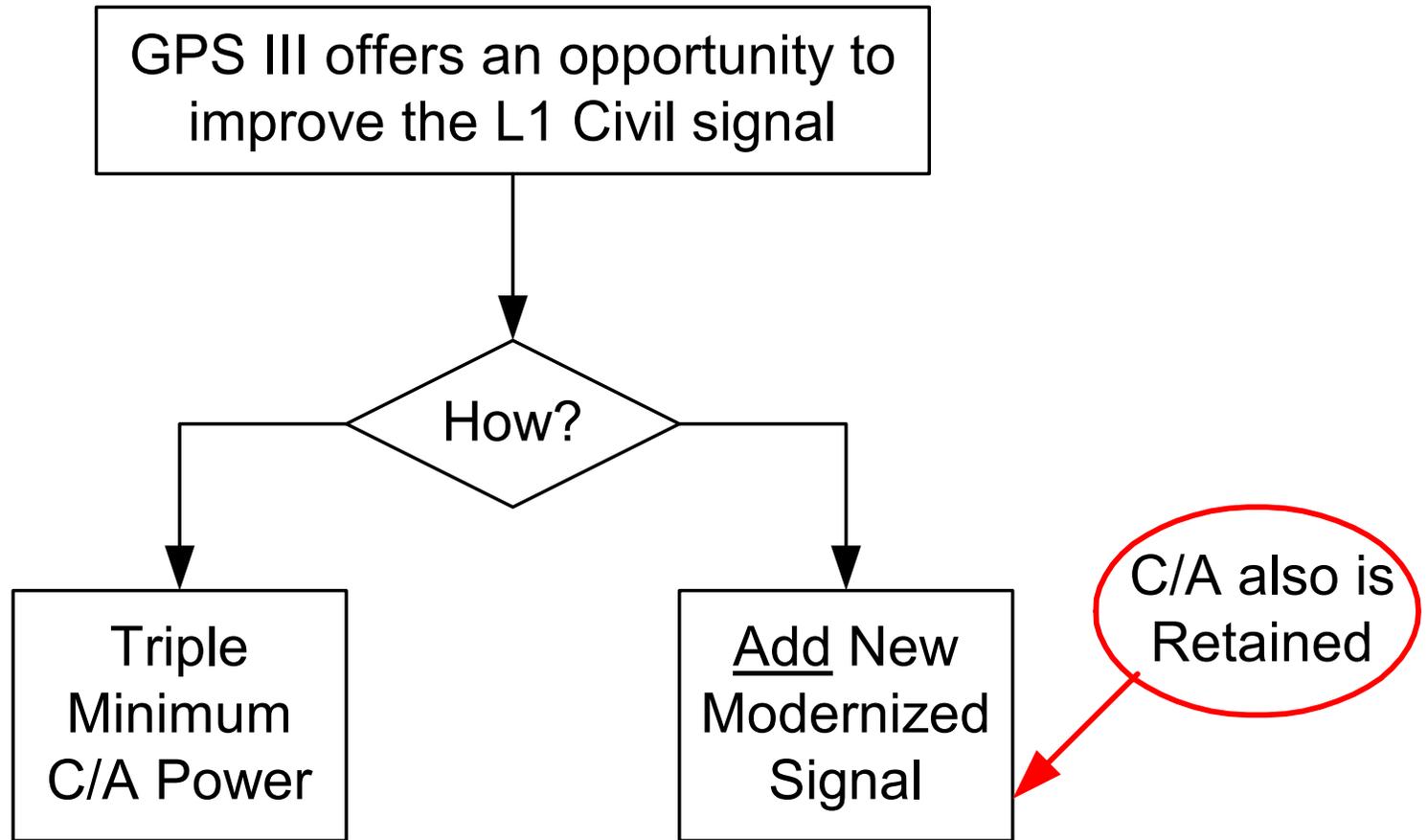
# Historic Changes and New Initiative

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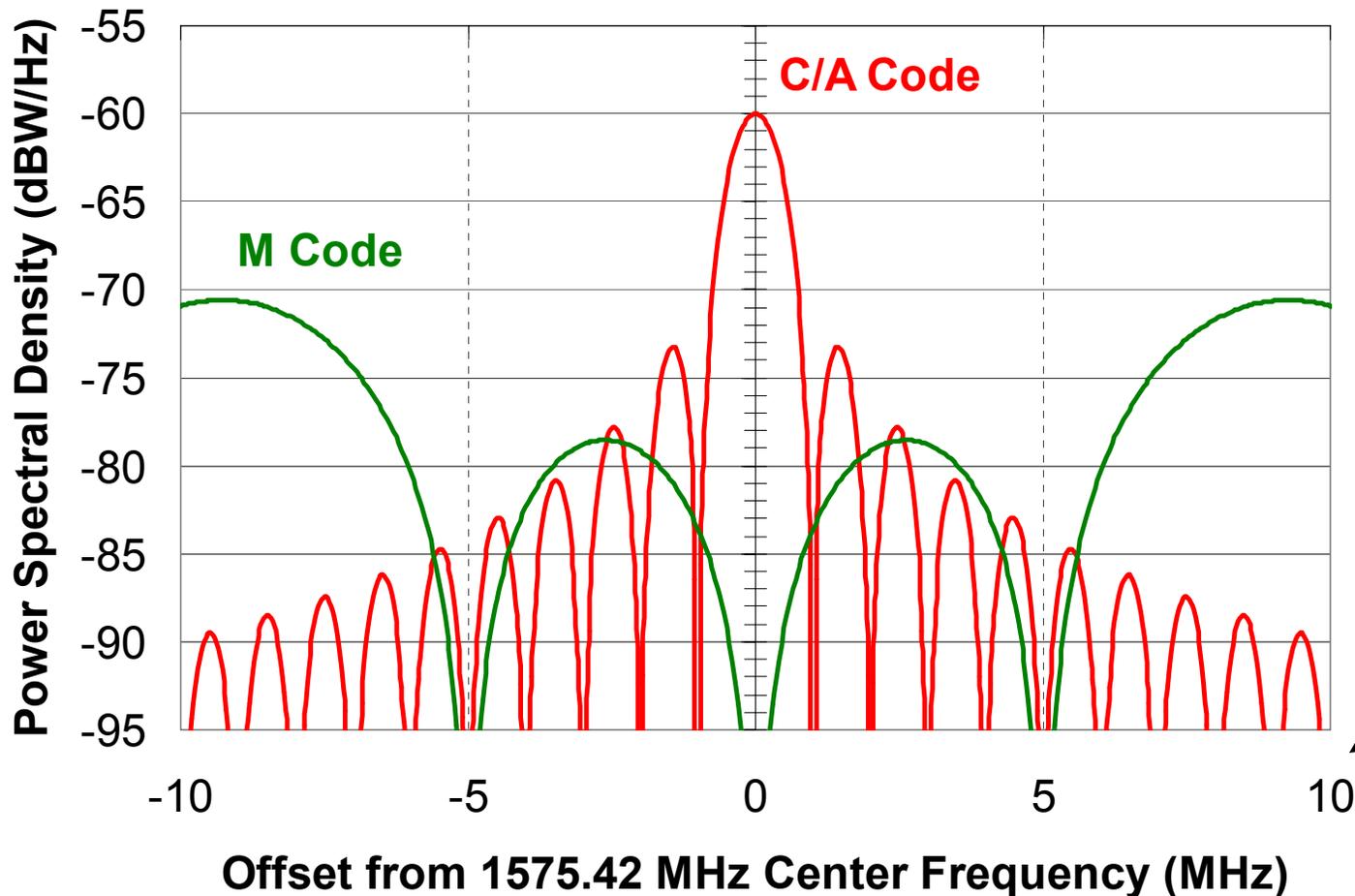
- **GPS has had only 3 navigation signals**
  - L1 C/A, L1 P/Y, L2 P/Y
- **GPS modernization will add at least 4 more**
  - L1 M, L2 M, L2C, and L5
- **All were designed without asking preferences**
  - Even L5, designed by an RTCA committee
- **Historic initiative:**
  - The IGEB has funded the L1C Project to seek input on the best approach for a new L1 civil signal



# First L1C Modernization Question



# Constrained to Fit Between M & C/A



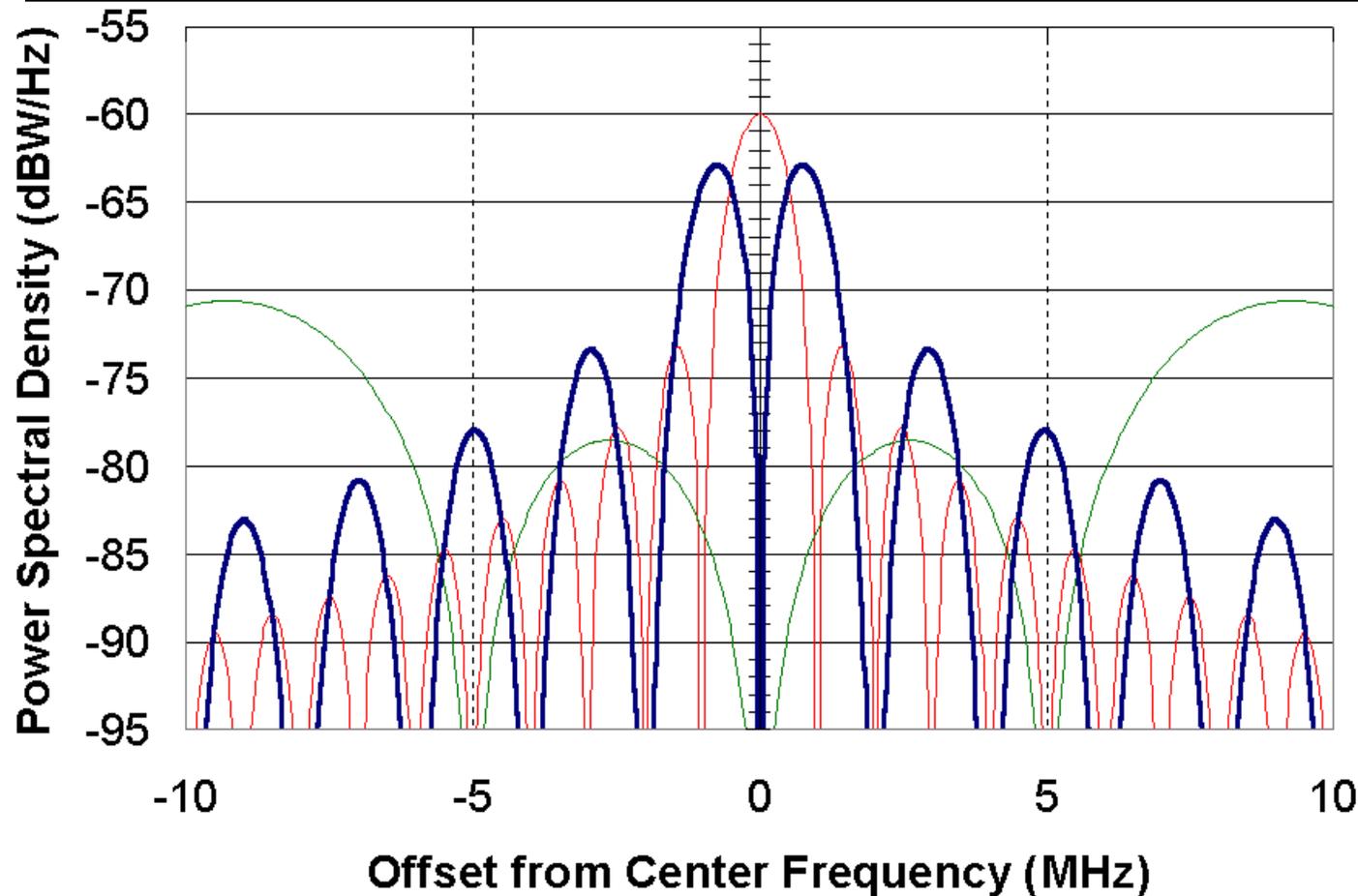
P(Y) is the “old” military signal

So, fitting between C/A and M codes is the focus

*Note change in frequency scale*



# Such As BOC(1,1) (OK for M and for C/A)



**BOC(1,1)  
Spectral  
Separation  
Coefficient  
(SSC)**

**For C/A =  
-67.8 dB/Hz**

**For M =  
-82.4 dB/Hz**

# News: Galileo Signal Decision

[http://europa.eu.int/rapid/start/cgi/guestfr.ksh?p\\_action.gettxt=gt&doc=IP/04/264|0|RAPID&lg=EN&display=](http://europa.eu.int/rapid/start/cgi/guestfr.ksh?p_action.gettxt=gt&doc=IP/04/264|0|RAPID&lg=EN&display=)

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## Loyola de Palacio welcomes the outcome of EU/US discussions on GALILEO

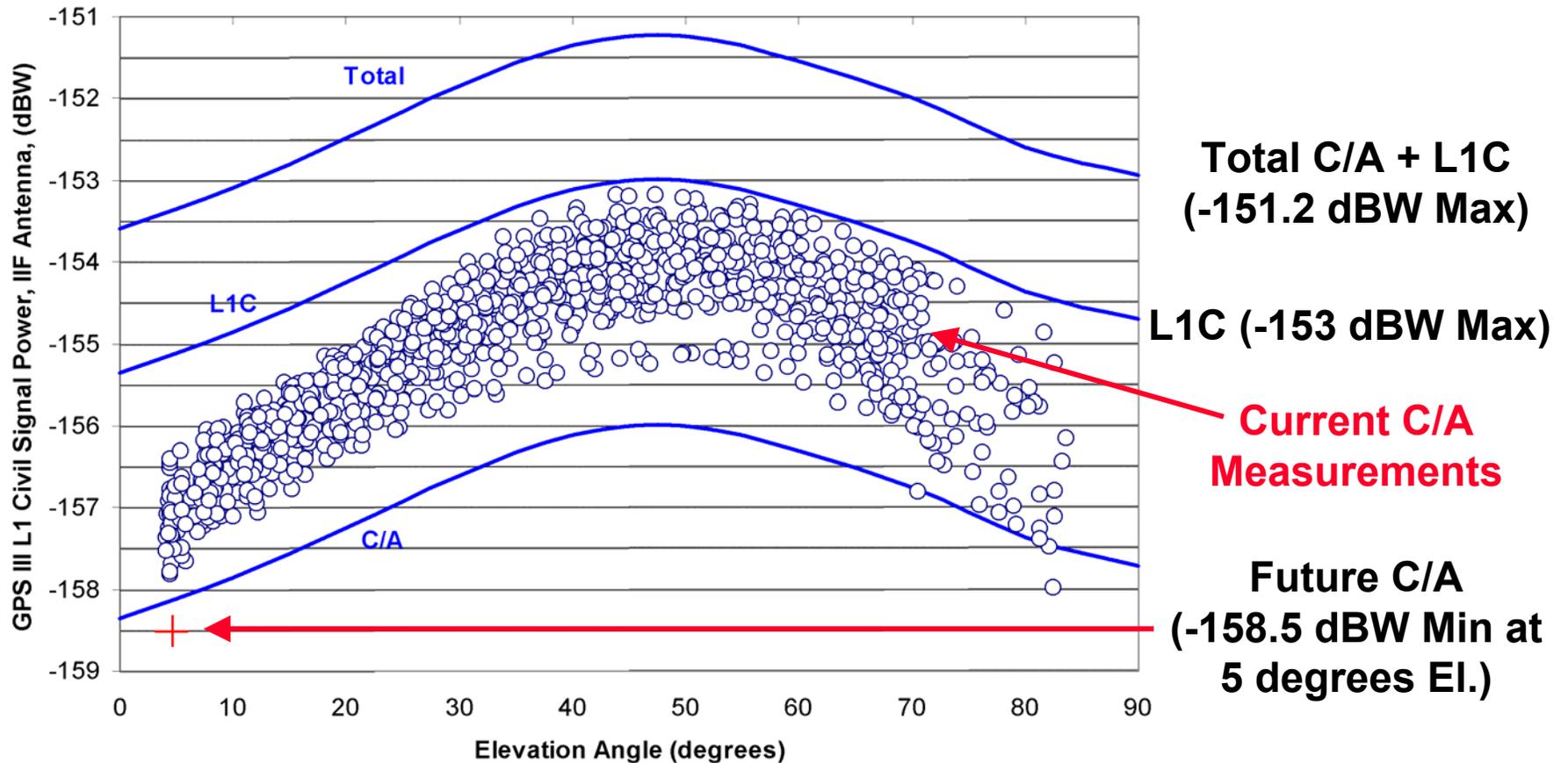
*The United States and the European Commission, joined by the European Union Member States, held a successful round of negotiations in Brussels on 24-25 February 2004. The delegations built upon progress made in The Hague and in Washington and were able to reach agreement on most of the overall principles of GPS/Galileo cooperation.*

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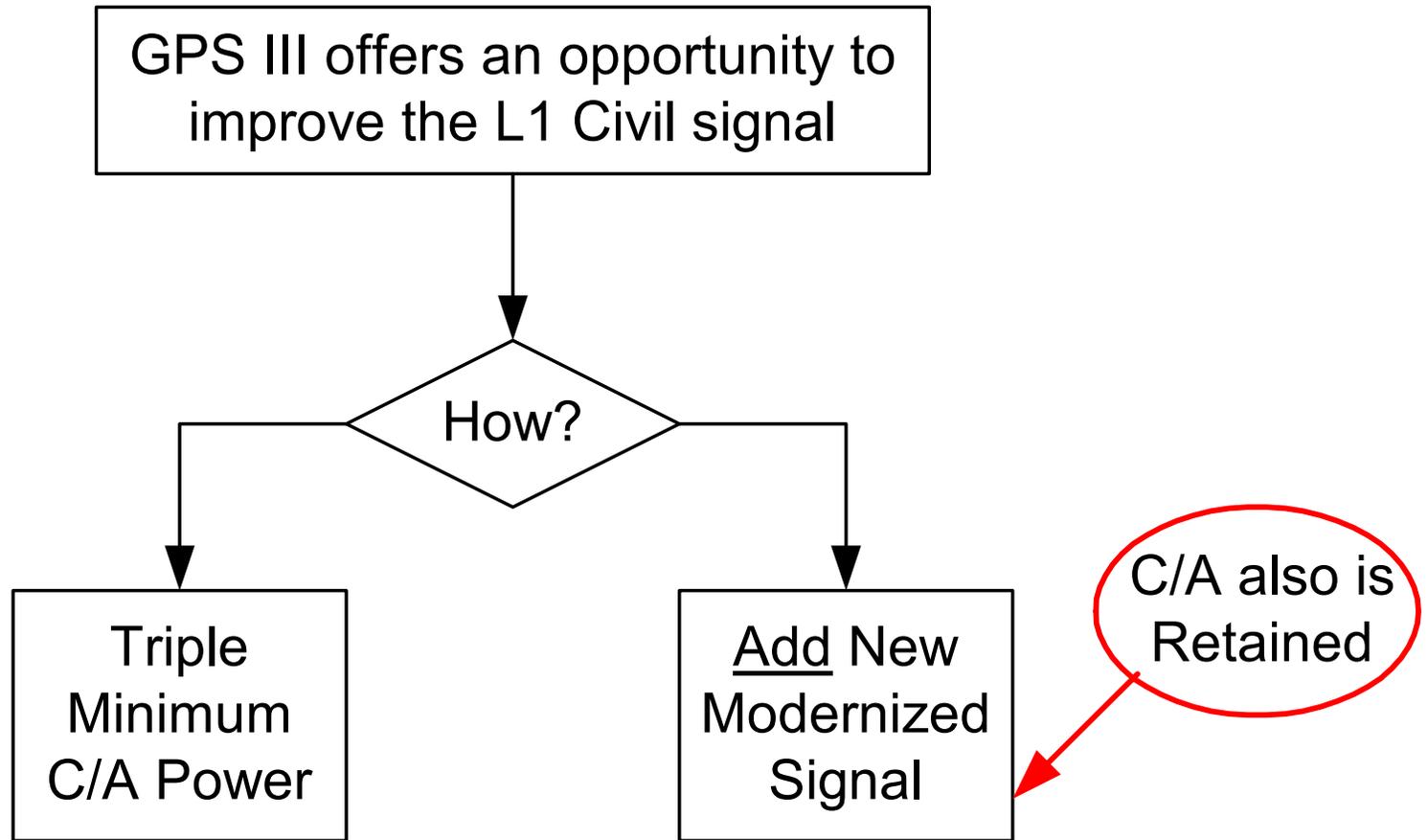
- Adoption of a common baseline signal structure for their respective open services (the future GPS intends to use a BOC 1,1 signal whereas the Galileo open service intends to use a fully compatible optimized version of the same signal which guarantees an high-level of performance).



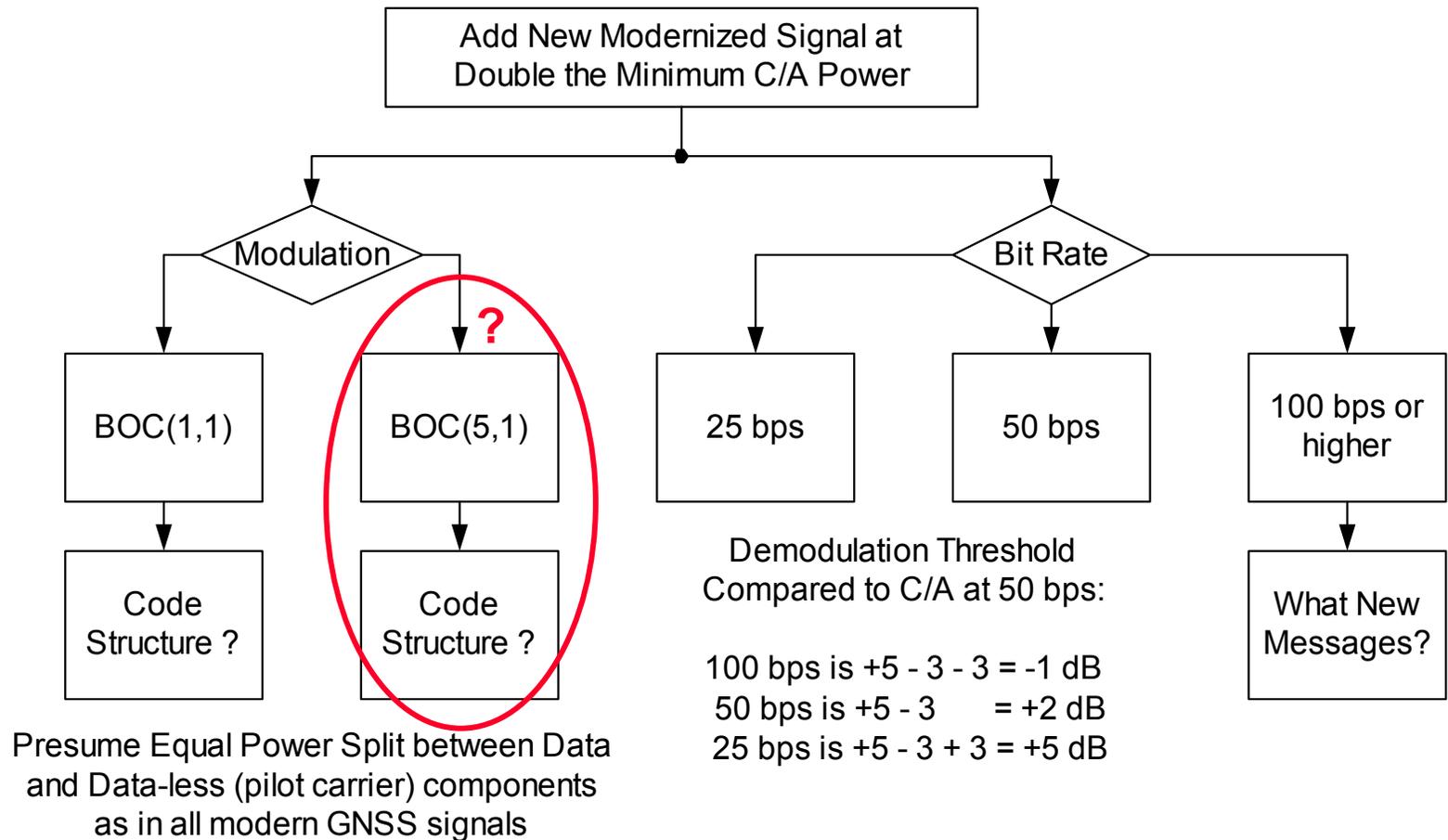
# GPS III Power Control Thinking



# First L1C Modernization Question

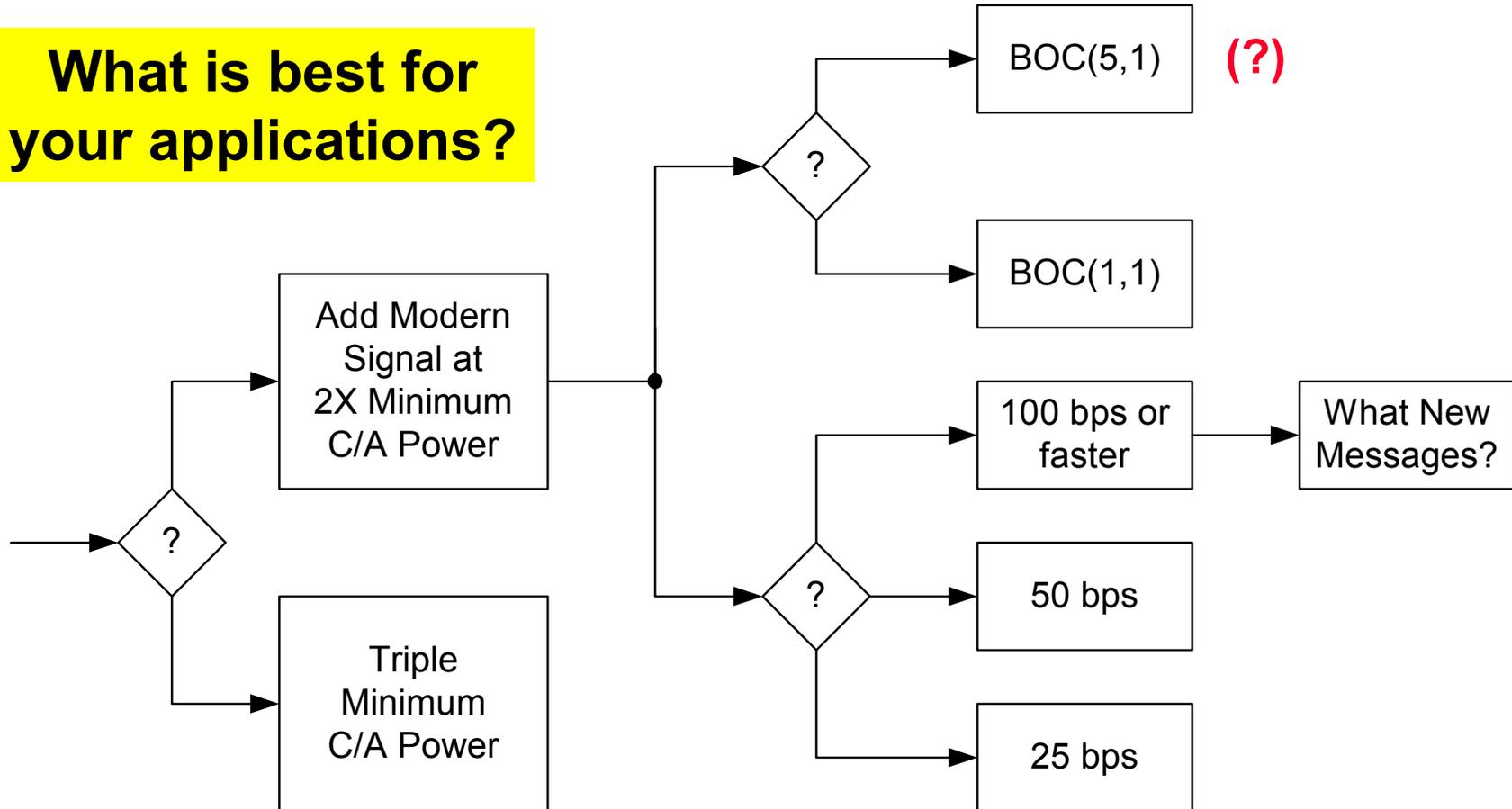


# Next L1C Modernization Questions



# Choose One After Each Diamond

What is best for your applications?



# Questionnaire Page 1

## L1C Questionnaire

Name: \_\_\_\_\_ Date: \_\_\_\_\_

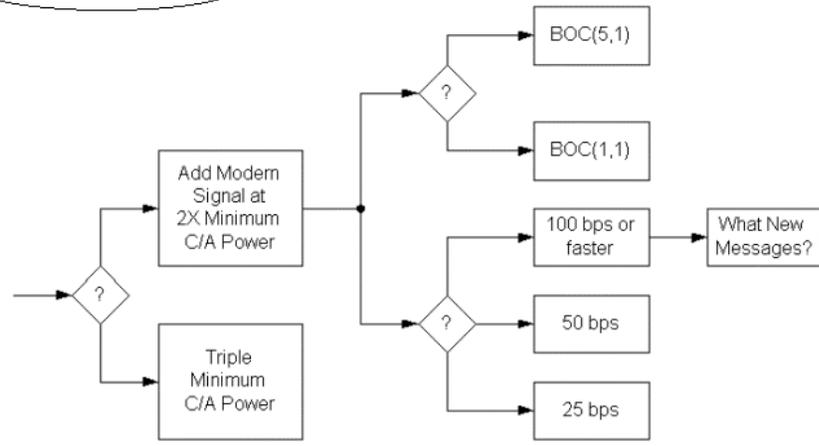
Title/Position \_\_\_\_\_

Organization \_\_\_\_\_

Address \_\_\_\_\_

Phone: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Circle Preferences:



What new messages:

Comments:



# Questionnaire Page 2

## Application Specific Questions

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Title/Position \_\_\_\_\_

Organization \_\_\_\_\_

Your Primary Expertise			
	Professional & Scientific	Commercial	Consumer
Land			
Sea			
Air			
Space			

Expected Number of Users in 2005			
	Professional & Scientific	Commercial	Consumer
Land			
Sea			
Air			
Space			

Expected Number of Users in 2020			
	Professional & Scientific	Commercial	Consumer
Land			
Sea			
Air			
Space			

**Applications**

1. \_\_\_\_\_

Parameter	Importance		Importance
	Best Desired	Worst Acceptable	
Accuracy			
TTF			
Availability			
Continuity			
Integrity			
Robustness			



# Schedule a Web-Based Interview

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**See Tom Stansell at the L1C Poster**

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